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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Wen-Hsiao Peng, et al.

Application No.: 09/758,647

Filed: January 10, 2001

Title: **METHOD AND APPARATUS FOR PROVIDIDING PREDICTION MODE FINE GRANULARITY SCALABILITY**

Confirmation No.: 9521

Art Unit: 2613

Examiner: Lee, Richard J.

APPEAL BRIEF

Mail Stop Appeal Brief - Patent
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Applicants submit the following Appeal Brief pursuant to 37 C.F.R. §41.37(c) for consideration by the Board of Patent Appeals and Interferences. Applicants also submit herewith a check in the amount of $500.00 to cover the cost of filing the opening brief as required by 37 C.F.R. § 1.17(f). Please charge any additional amount due or credit any overpayment to deposit Account No. 02-2666.

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I. REAL PARTY IN INTEREST

Wen-Hsiao Peng and Yen-Kuang Chen, the parties named in the caption, transferred their rights to that which is disclosed in the subject application through an assignment recorded on April 9, 2001 (011690/0141) in the patent application to Intel Corporation, of Santa Clara, California. Thus, as the owner at the time the brief is being filed, Intel Corporation, of Santa Clara, California is the real party in interest.

II. RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences which will affect or be affected by the outcome of this appeal.

III. STATUS OF CLAIMS

Claims 1-24 are pending and rejected in this application. Applicants hereby appeal the rejection of all pending claims.

IV. STATUS OF AMENDMENTS

The claims are amended in accordance with an Amendment filed on May 28, 2004, wherein Claims 1, 9 and 17 were amended. Claims 25 and 26 were previously added in a Response to Final Office Action filed January 27, 2004 and were withdrawn by the Examiner in the Office Action mailed February 25, 2004. The claim amendments requested in the Amendment filed on May 28, 2004 regarding Claims 1, 9 and 17 were entered.

V. SUMMARY OF THE CLAIMED SUBJECT MATTER

The pending claims relate to a method and apparatus for providing prediction mode fine granularity scalability. As recited by independent Claims 1 and 9, a first body of data 32 is generated being sufficient to permit generation of a viewable video sequence of lesser quality than is represented by a source video sequence (30). (*See*, Applicants' Specification, pg. 7, lines 15-19.) As illustrated with reference to FIGS. 2 and 6 of Applicants' specification, a second body of data 34 is generated, which is sufficient to enhance the quality of the viewable video sequence generated from the first body of data 32, the second body of data 34 being generated by

subtracting a reconstructed body of data from a subsection of the source video sequence 30. (*See*, Applicants' Specification, pg. 8, lines 9-14.)

As illustrated in FIG. 6 of Applicants' specification, the reconstructed body of data is selected from a group of at least two separate reconstructed bodies of data (682, 684, 686), and the second body of data 34 includes an enhancement layer 680 that captures differences between the viewable video sequence and the source video sequence 30. As illustrated by prediction mode block 678 a subsection of the enhancement layer 680 is predicted according to a prediction mode of a plurality of prediction modes of the prediction mode block 678. As illustrated, the plurality of prediction modes provided by the prediction mode block 678 includes prediction using the source video sequence 30 and a combination of a previous enhancement frame 684 and the first body of data 682. (*See*, Applicants' Specification, pg. 16, lines 5-13.)

Claim 17 recites a system that includes a first unit (40) to generate a first body of data (32) being sufficient to permit generation of a viewable video sequence of lesser quality than is represented by a source video sequence (30). As illustrated with reference to FIGS. 2 and 6 of Applicants' specification, a second unit generates a second body of data 34 being sufficient to enhance the quality of the viewable video sequence generated from the first body of data 32. As illustrated, the second body of data 34 is generated by subtracting a reconstructed body of data from a subsection of the source video sequence 30. (*See*, Applicants' Specification, pg. 7, lines 15-19.)

As illustrated with reference to FIG. 6 of Applicants' specification, the reconstructed body of data selected from a group of at least two separate reconstructed bodies of data (682, 684, 686) and the second body of data includes an enhancement layer 680 that captures differences between the viewable video sequence and a source video sequence 30. As further illustrated by FIG. 6, a subsection of the enhancement layer 680 is predicted according to a prediction mode of a plurality of prediction modes by a prediction mode block 678. As illustrated, the plurality of prediction modes includes prediction using the source video sequence 30 and a combination of a previous enhancement frame 684 and the first body of data 682. (*See*, Applicants' Specification, pg. 16, lines 5-13.)

As recited by independent Claims 1, and 9, the process of using one or more enhancement layers to scale the quality of output video is referred as "fine granularity scalability" or FGS. FGS may be employed to produce a range of quality output, for example, as

limited by bandwidth constraints, which may prohibit additional transfer of enhancement layers with the base layer. In other words, combining the base layer with one or more enhancement layers at the receiving end will result in a video output of quality nearly equal to the original input video, as recited by independent Claim 19. (*See*, Applicants' Specification, pg. 16, line 8 to pg. 9, line 14.)

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The grounds of rejection involved in this appeal are as follows:

Are Claims 1-24 unpatentable under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,436,665 issued to Ueno et al. ("Ueno") in view of U.S. Patent Application No. 2002/0080878 A1 to Li ("Li")?

VII. ARGUMENT

A. Overview of the Cited References

1. Overview of Ueno Reference

Ueno describes a motion picture coding apparatus for use in a system, which transmits motion pictures over a line, such as a video conference or a video telephone, a system for storing motion pictures on a storage medium, such as optical disc or a video tape, and digital television broadcasting. (*See*, Ueno, col. 1, lines 13-19.) Ueno discloses switching predictions for even and odd fields of video using a low resolution local decoded signal and a high resolution local decoded signal on a field-by-field basis. (Ueno, col. 7, lines 42-49.)

In particular, FIGS. 3A and 3B of Ueno teach that:

> [T]hree candidates are produced for a low-resolution predictive signal ((1) odd: low resolution, even: high resolution; (2) odd: high resolution, even: low resolution; (3) low resolution for both odd and even). The predictor and prediction-mode decision unit 104 selects a candidate, which optimizes the prediction error, from among those three candidates from the low-resolution predictive signal and candidates from the high-resolution predictive signal, gives the optimal candidate as a predictive signal to the sub-tracter 12 and sends a prediction mode to the variable-length coder 19. (col. 9, lines 38-48.) (Emphasis added.)

As illustrated with reference to FIG. 4 of Ueno:

> FIG. 4 is a block diagram showing an example of the structure of the predictor and prediction-mode decision unit 104 in FIG. 1, and its operation will

> be described in association with the description of FIGS. 3A and 3B. (col. 9, lines 57-60.)

As further described by Ueno:

> An even/odd-numbered line merge circuit 133 executes three types of merging from a combination of the above, yielding a predictive signal corresponding to FIGS. 3A and 3B, and this signal is sent to the prediction-mode decision unit 135. The high-resolution prediction circuit 134 prepares a high-resolution predictive signal other than the sent predictive signal using lower-resolution signal (e.g., a signal corresponding to prediction that is currently under consideration in MPEG2), and it is sent together with a corresponding motion vector to the prediction-mode decision unit 135. The prediction-mode decision unit 135 selects a predictive signal, which minimizes the prediction error, from among all the received predictive signals, and sends it to the subtracter 12. The prediction-mode decision unit 135 also selects a motion vector, which minimizes the prediction error, from among all the received motion vectors, and sends it to the variable-length coder 19. (col. 10, lines 5-22.) (Emphasis added.)

As further illustrated with reference to FIGS. 1 and 26 of Ueno, the predictive signal is not stored within frame memory 27. As described by Ueno, frame memory 27 stores a high resolution signal, which may be used in combination with the low resolution signal and the input picture signal to generate the prediction signal. (*See*, Ueno, col. 8, lines 14-23.)

In other words, as described with reference to the decoding apparatus illustrated in FIG. 26 of Ueno:

> The predictor 204 uses the high-resolution picture stored in the frame memories 227 and the low-resolution picture input from the up-sampling circuit 216 as reference pictures for forming a predictive signal. A method for forming a predictive signal is basically similar to the predictor 104 shown in FIG. 1. (col. 12, lines 48-53.) (Emphasis added.)

Accordingly, the prediction signal generated by Ueno is never stored, and therefore, cannot be used in combination with the base layer to predict an enhancement layer. In addition, Ueno is devoid of any teachings regarding a base layer and a combination of the base layer with one or more enhancement layers to provide fine granularity scaling or FGS.

2. Overview of Li Reference

Li describes a video apparatus and method for a digital video enhancement. As specifically described within Li:

To achieve the highest possible compression and the highest possible quality for a given region of interest, it would be desirable to have an apparatus and method to automatically identify the region of interest encoded at a higher quality than the rest of the frame. (Li, ¶0003.)

As described within Li:

After identifying the region of interest in a frame, . . . to ensure a higher quality for the identified region of interest, the quantization step-size in the base layer and the bit shifting in the enhancement layer are controlled. The quality of a macro block depends on how much quantization is done in the base layer and how many bit planes are received in the enhancement layer. Therefore, for a macro block associated within identified region of interest, we also use a smaller quantization step-size in the base layer . . . The result is that if only the base layer is transmitted, the identified region of interest has a higher quality than the rest of the frame. (Li, ¶0012.)

Li's application describes an apparatus to automatically identify the region of interest in the picture and coded at a higher quality than the rest of the frame. (Li, ¶0003.) Li includes a motion estimation circuit 145 that finds the motion vector of a macro block and the current frame relative to the previous frame. (Li, ¶0009.) Thus, it is evident that Li fails to mention any prediction with regards to the identified region of interest.

As further described by Li, if part of the enhancement bit stream is received, more bit planes associated with the identified region of interest are received relative to the rest of the frame and the quality is much enhanced. (*See*, Li, ¶00012.)

B. Rejection of Claims 1-5, 8-13, 16-21 and 24 as Obvious Over Ueno in View of Li

The Examiner rejected all pending claims, including Claims 1-5, 8-13, 16-21 and 24 under 35 U.S.C. §103(a) as being unpatentable over Ueno in view of Li.

1. Errors of Law and Fact in the Rejection

For the reasons provided below, the Examiner has failed to establish a *prima facie* case of obviousness in view of the references of record. The Federal Circuit Court of Appeals in In re Rijckaert, 9 F.3d 1531, 28 U.S.P.Q. 2d 1955 (Fed. Cir. 1993) held that:

In rejecting claims under 35 U.S.C. § 103, the examiner bears the initial burden of presenting a *prima facie* case of obviousness. . . . "A *prima facie* case of obviousness is established when the teaching from the prior art itself would appear to have suggested the claimed subject matter to a person of ordinary skill in the art.". . . If the examiner fails to establish a *prima facie* case, the rejection is

> improper and will be overturned. (Emphasis added.) 9 F.3d at 1532, 28 U.S.P.Q. 2d at 1956.

According to the Examiner, Ueno teaches a second unit to generate a second body of data, as recited by the claimed invention. Specifically, as indicated by the Examiner, Ueno teaches:

> A second unit (100, 101, 12, 17-24, 27, 104 of FIG. 1) to generate a second body of data sufficient to enhance the quality of the viewable video sequence generated from the first body of data. (*See*, col. 7, line 42 - col. 8, line 38.) (*See*, Final Office Action mailed August 2, 2004.)

Based on the cited passages above, Applicants interpret the second body of data referred to by the Examiner as the prediction signal generated by the prediction block 104 of FIG. 1.

As correctly pointed out by the Examiner, Ueno does not particularly teach that the second body of data includes one or more enhancement layers as claimed. According to the Examiner:

> It is however considered obvious that the high resolution signal generated by the second body of Ueno is equivalent to one or more enhancement layers as claimed. (*See*, pg. 4, ¶ 2 of the Final Office Action mailed August 2, 2004.) (Emphasis added.)

To support this argument, the Examiner states that:

> Ueno et al does teach that the second body includes a high resolution signal (see column 8, line 59 to column 9, line 8) that captures differences between the viewable video sequence and the source video sequence (i.e., differences between the (a) low resolution picture, high resolution picture, and intra-frame prediction picture derived from the predictor and prediction mode decision unit 104, and (b) the input signal are compared to select a prediction mode, with the low resolution picture representing the viewable video sequence being and the input signal representing the source video sequence as claimed, see column 9, line 8). (*See*, pg. 4, ¶ 2 of the Final Office Action, mailed August 2, 2004.) (Emphasis added.)

However, as indicated with reference to col. 8, line 59 to col. 9, line 8 of Ueno, the passage cited by the Examiner describes prediction conditions and the differences referred to between the prediction candidates and the input signal refer to prediction error signals. As described by Ueno, the prediction error signal is the difference between the input picture and the predictive signals. (*See*, col. 3, lines 58-62.) Hence, the prediction signal eventually generated

by prediction block 104 is selected, which optimizes the prediction error or minimizes the prediction error. (*See*, col. 9, lines 38-48 and col. 10, lines 15-22 of Ueno.)

Accordingly, as illustrated by the cited passages of Ueno, the high resolution signal referred to by the Examiner does not capture differences between the viewable video sequence and the source video sequence. In fact, the prediction signal selected from various prediction candidates is the prediction candidate that yields the minimum difference from the source video sequence. Hence, Ueno fails to teach that the second body of data includes a high resolution signal that captures differences between the viewable video sequence and the source video sequence, as contended by the Examiner.

As further indicated above, the Examiner believes that the second body of Ueno is equivalent to the one or more enhancement layers as claimed. Assuming, *arguendo*, that the high resolution signal (prediction signal) generated by the second body of Ueno is equivalent to one or more enhancement layers, as illustrated in FIG. 26 of Ueno, the prediction signal generated by predictor 204 is combined with the signal received from inverse DCT 233 to generate a high resolution picture. However, as illustrated with reference to both FIGS. 1 and 26, the prediction signal generated by Ueno is never stored. Accordingly, assuming this prediction signal of Ueno is an enhancement layer, as suggested by the Examiner, without storage of this enhancement layer, the enhancement layer cannot be used to predict a subsequent enhancement layer, as recited by Claims 1 and 9.

The Examiner further cites Li, which according to the Examiner:

> teaches the conventional enhancement layer generations and that high resolution images are achieved through the enhancement layer coding. (*See*, enhancement layer of FIG. 1, pg. 1, section [0008], pg. 2, section [0012].)

According to the Examiner, in view of such teachings of Li, it is considered obvious that the second unit (100, 101, 12, 17-24, 27, 104 of FIG. 1) of Ueno generates a second body of data being sufficient to enhance the quality of the viewable video sequence generated from the first body of data provides the same enhancement layer coding as claimed. (*See*, pp. 4 and 5 of Office Action mailed August 2, 2004.)

However, as described with reference to the decoding apparatus illustrated in FIG. 26 of Ueno:

> The predictor 204 uses the high-resolution picture stored in the frame memories 227 and the low-resolution picture input from the up-sampling circuit

216 as reference pictures for forming a predictive signal. A method for forming a predictive signal is basically similar to the predictor 104 shown in FIG. 1. (col. 12, lines 48-53.) (Emphasis added.)

Based on the cited passage, Applicants respectfully submit that assuming, arguendo, that the prediction signal generated by Ueno represents an enhancement layer, this prediction signal is never stored, and therefore, cannot be used in combination with the base layer to predict an enhancement layer, as recited by Claims 1 and 9.

Accordingly, Applicants respectfully submit that the combined teachings of Ueno in view of Li would not have suggested the claimed invention to one of ordinary skill in the art, as required to establish a *prima facie* case of obviousness. Id.

Furthermore, case law has established that obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention absent the teaching or suggestion supporting such combination. ACS Hospital Sys., Inc. v. Montefiore Hospital, 732 F.2d. 1572, 1577, 221 U.S.P.Q. 929, 933 (Fed. Cir. 1984). Moreover, one cannot find obviousness through hindsight to construct a claimed invention from elements of the prior art. In re Warner, 379 F.2d 1011, 1016, 154 U.S.P.Q. 173, 177 (C.C.P.A. 1967).

Here, Ueno is completely devoid of and fails to teach or suggest a base layer and one or more enhancement layers to provide, for example, fine granularity scaling. Instead, Ueno is directed to, and lists as a primary object of the invention, improving the coding efficiency by effectively utilizing the predictive ability using a low resolution decoded signal in the predictive coding of a high resolution picture. (*See*, Ueno, col. 3, lines 6-11.) Conversely, the teachings of Li are directed to identifying a portion of interest in a video region and enhancing the quality of the region of interest by providing additional bits for coding said region. (*See*, Li, ¶¶003, 0012.)

Applicants respectfully submit that one skilled in the art would not have a motivation for the combination or modification of Ueno in view of Li due to the lack of any relationship between the use of a low resolution decoded signal in the predictive coding of a high resolution picture, as taught by Ueno, and enhancement layer coding as taught by Li. Applicants respectfully submit that both the references of Ueno and Li, as well as the skill in the art, would not provide a suggestion or motivation for combining the reference teachings, as required to establish a *prima facie* case of obviousness. Accordingly, Applicants respectfully submit that the

Examiner fails to establish that it would be obvious to combine the missing elements provided by Ueno with the teachings of Li.

Consequently, Applicants respectfully submit that the Examiner could only arrive at the claimed invention through inappropriate hindsight. Accordingly, Applicants respectfully submit that the combined teachings of Ueno in view of Li would not have suggested the claimed invention to one of ordinary skill in the art, as required to establish a *prima facie* case of obviousness. Hence, a *prima facie* case of obviousness has not been established and the rejection is erroneous and should be overturned.

2. Specific Limitations Not Described in the Prior Art

Independent Claims 1 and 9 recite analogous claim features. Claim 1 is representative. Independent Claim 1 recites the following claim feature, which is neither taught nor suggested by either Ueno, Li or the references of record:

> . . . . wherein the second body of data includes an enhancement layer that captures differences between the viewable video sequence and the source video sequence; and
>
> predicting a subsection of the enhancement layer according to a prediction mode of a plurality of prediction modes, the plurality of prediction modes including prediction using the source video sequence and a combination of a previous enhancement frame and the first body of data. (Emphasis added.)

3. Explanation Why Such Limitations Render the Claims Non-obvious Over the Prior Art

According to the Examiner, one skilled in the art would have no difficulty in providing the enhancement layer coding, as taught by Li, for this system as shown in FIG. 1 of Ueno. (*See*, pg. 5 of Office Action mailed August 2, 2004.) Applicants respectfully disagree with the Examiner's contention.

Furthermore, even if Ueno could be modified to teach that the second body of data including an enhancement layer according to Li, such modification would fail to teach the prediction of a subsection of the enhancement layer using the source video sequence in a combination with a previous enhancement frame and the first body of data, since neither Li nor Ueno provides any teachings with regards to storing of an enhancement layer to predict a subsequent enhancement layer.

However, the case law is clear in establishing that "to establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art." In re Royka, 490 F.2d 981, 180 U.S.P.Q. 580 (CCPA 1974).

Here, the combination or modification of Ueno in view of Li would fail to teach or suggest storing of an enhancement layer to predict a subsequent enhancement layer, as recited by the claimed invention. Hence, the Examiner fails to establish a *prima facie* case of obviousness since the combination or modification of Ueno in view of Li fails to teach all limitations of the claimed invention. Id.

In addition, Claims 1 and 9 recite that the:

> . . . second body of data being generated by subtracting a reconstructed body of data from a subsection of the source video sequence.

As indicated above, the Examiner identifies the second body of data as the prediction signal generated by the prediction and prediction mode decision unit 104. However, as is clearly illustrated by FIGS. 1-5 of Ueno, the prediction signal is not based on differences between a reconstructed signal and the input picture signal, but is in fact formed by selecting a prediction candidate that yields the smallest difference when subtracted from the input picture signal to provide the prediction error. (*See*, Ueno, col. 9, lines 38-48 and col. 10, lines 15-22.)

Hence, the Examiner fails to establish a *prima facie* case of obviousness since the combination or modification of Ueno in view of Li fails to teach all limitations of the claimed invention. Id.

Furthermore, for at least the reasons indicated above, the Examiner also fails to illustrate a motivation within either Ueno, Li or the skill in the art to combine or modify Ueno, as suggested by the Examiner in view of Li. Accordingly, Applicants respectfully submit that the features of the claimed invention can only be arrived at through inappropriate hindsight.

Therefore, Applicants respectfully submit that a *prima facie* case of obviousness is not established and therefore, the rejection is erroneous and should be overturned. Accordingly, Applicants respectfully request that the §103(a) rejection of Claims 1-5, 8-13, 16-21 and 24 be overturned.

C. Rejection of Claims 6, 14 and 22 as Obvious Over Ueno in View of Li

The Examiner rejected all pending claims, including Claims 6, 14 and 22 under 35 U.S.C. §103(a) as being unpatentable over Ueno in view of Li.

1. Errors of Law and Fact in the Rejection

The Examiner has made the same error as described previously with respect to the rejected Claims 1-5, 8-13, 16-21 and 24. In addition, the Examiner has failed to show a teaching or suggestion to combine, or modify, Ueno in view of Li.

The Examiner recognizes the failure of Ueno to teach enhancement layer generation, and as a result cites Li. According to the Examiner, Li;

> teaches the conventional enhancement layer generation and that high resolution images are achieved through the enhancement layer coding. (*See*, enhancement layer of FIG. 1, pg. 1, section [0008], pg. 2, section [0012].)

According to the Examiner, in view of such teachings of Li, it is considered obvious that the second unit (100, 101, 12, 17-24, 27, 104 of FIG. 1) of Ueno generates a second body of data sufficient to enhance the quality of the viewable video sequence generated from the first body of data provides the same enhancement layer coding as claimed. (*See*, pp. 4-5 of Final Office Action mailed August 2, 2004.)

Although the illustrated passages of Li describe FGS functionality, such cited passages do not support the Examiner's contention that high resolution images are achieved through enhancement layer coding. The cited passage describes FGS as well as a technique:

> to automatically identify the region of interest and code it at a higher quality than the rest of the frame. (*See*, Li, ¶0003.)

Hence, Ueno in view of Li fails to teach that the prediction signal generated by unit 104 provides the same enhancement layer coding as claimed. Furthermore, the Examiner has failed to show a teaching or suggestion to combine, or modify, Ueno in view of Li.

Case law has established that obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention absent the teaching or suggestion supporting such combination. ACS Hospital Sys., Inc. v. Montefiore Hospital, 732 F.2d. 1572, 1577, 221 U.S.P.Q. 929, 933 (Fed. Cir. 1984). Also, one cannot find obviousness through hindsight to construct a claimed invention from elements of the prior art. In re Warner, 379 F.2d 1011, 1016, 154 U.S.P.Q. 173, 177 (C.C.P.A. 1967).

Here, Ueno is completely devoid of and fails to teach or suggest a base layer and one or more enhancement layers to provide, for example, fine granularity scaling. Instead, Ueno is directed to, and lists as a primary object of the invention, improving the coding efficiency by effectively utilizing the predictive ability using a low resolution decoded signal in the predictive coding of a high resolution picture. (*See*, Ueno, col. 3, lines 6-11.) Conversely, the teachings of Li are directed to identifying a portion of interest in a video region and enhancing the quality of the region of interest by providing additional bits for coding said region. (*See*, Li, ¶¶003, 0012.)

Applicants respectfully submit that one skilled in the art would not have a motivation for the combination or modification of Ueno in view of Li due to the lack of any relationship between the use of a low resolution decoded signal in the predictive coding of a high resolution picture, as taught by Ueno, and enhancement layer coding as taught by Li. Applicants respectfully submit that both the references of Ueno and Li, as well as the skill in the art, would not provide a suggestion or motivation for combining the reference teachings, as required to establish a *prima facie* case of obviousness. Accordingly, Applicants respectfully submit that the Examiner fails to establish that it would be obvious to combine the missing elements provided by Ueno with the teachings of Li.

Consequently, Applicants respectfully submit that the Examiner could only arrive at the claimed invention through inappropriate hindsight. Accordingly, Applicants respectfully submit that the combined teachings of Ueno in view of Li would not have suggested the claimed invention to one of ordinary skill in the art, as required to establish a *prima facie* case of obviousness. Hence, a *prima facie* case of obviousness has not been established and the rejection is erroneous and should be overturned.

2. Specific Limitations Not Described in the Prior Art

Claims 6, 14 and 22 recite analogous claim features. Claim 6 is representative. Claim 6 recites the following claim feature, which is neither taught nor suggested by either Ueno, Li or the references of record:

> wherein the selection of the reconstructed body of data is indicated in a syntax of a bit-stream transmitted from an encoder.

3. Explanation Why Such Limitations Render the Claims Non-obvious Over the Prior Art

According to the Examiner, Ueno teaches:

> wherein the selection of the reconstructed body of data is indicated in a syntax of a bit stream transmitted from the system. (*See*, col. 9, lines 38-53, col. 10, line 51 - col. 11, line 40.) (*See*, pp. 3, ¶1 of Final Office Action mailed August 2, 2004.)

However, the passages cited by the Examiner describe the formation of the prediction candidates. Specifically, as described by Ueno:

> An even/odd numbered line merge circuit executes three types of merging from a combination of the above, yielding a predictive signal corresponding to FIGS. 3A and 3B, and this signal is sent to the prediction mode decision unit 135. (*See*, col. 10, lines 5-9.) (Emphasis added.)

As described by Ueno;

> [T]hree candidates are produced for a low resolution predictive signal ((1) odd: low resolution, even: high resolution; (2) odd: high resolution, even: low resolution; (3) low resolution for both odd and even). The prediction and prediction mode decision unit 104 selects the candidate, which optimizes the prediction error, from among these three candidates from the low resolution predictive signal and candidates from the high resolution predictive signal, gives the optimal candidate as the predictive signal to the subtracter 12 and sends a prediction mode to the variable length coder 19. (col. 9, lines 38-48.) (Emphasis added.)

In particular, Applicants respectfully submit that the even/odd numbered line separation circuit 130 and 133 separate the input picture, as illustrated with reference to FIGS. 3A and 3B, to generate the predictive signal. However, as is clearly illustrated by FIGS. 1 and 26 of Ueno, the high resolution picture provided by output 21 is not divided into even and odd fields, as such division is only performed to generate the predictive signal, as illustrated with reference to FIGS. 4 and 5 of Ueno.

Here, the combination or modification of Ueno in view of Li would fail to teach or suggest the selection of the reconstructed body of data as indicated in syntax of a bit stream transmitted from an encoder, as recited by the claimed invention. Applicants respectfully submit that the separation of an input picture into even and odd fields, as taught by Ueno, to generate a predictive signal is not part of a final high resolution picture generated by the teachings of Ueno.

Hence, the Examiner fails to establish a *prima facie* case of obviousness since the combination or modification of Ueno in view of Li fails to teach all the limitations of the claimed invention. Id. Furthermore, for at least the reasons indicated above, the Examiner also fails to illustrate a motivation within either Ueno, Li or the skill in the art to modify Ueno, as suggested

by the Examiner in view of Li. Accordingly, Applicants respectfully submit that the features of the claimed invention could only be arrived at through inappropriate hindsight.

Therefore, Applicants respectfully submit that a *prima facie* case of obviousness is not established and therefore, the rejection is erroneous and should be overturned. Accordingly, Applicants respectfully request that the §103(a) rejection of Claims 6, 12 and 22 be overturned.

D. Rejection of Claims 7, 15 and 23 as Obvious Over Ueno in View of Li

The Examiner rejected all pending claims, including Claims 7, 15 and 23 under 35 U.S.C. §103(a) as being unpatentable over Ueno in view of Li.

1. Errors of Law and Fact in the Rejection

The Examiner has made the same error as described previously with respect to the rejected Claims 1-6, 8-14, 16-22 and 24. In addition, the Examiner has failed to show a teaching or suggestion to combine, or modify, Ueno in view of Li.

Applicants respectfully submit that one skilled in the art would not have a motivation for the combination or modification of Ueno in view of Li due to the lack of any relationship between the use of a low resolution decoded signal in the predictive coding of a high resolution picture, as taught by Ueno, and enhancement layer coding as taught by Li. Applicants respectfully submit that both the references of Ueno and Li, as well as the skill in the art, would not provide a suggestion or motivation for combining the reference teachings, as required to establish a *prima facie* case of obviousness. Accordingly, Applicants respectfully submit that the Examiner fails to establish that it would be obvious to combine the missing elements provided by Ueno with the teachings of Li.

Consequently, Applicants respectfully submit that the Examiner could only arrive at the claimed invention through inappropriate hindsight. Accordingly, Applicants respectfully submit that the combined teachings of Ueno in view of Li would not have suggested the claimed invention to one of ordinary skill in the art, as required to establish a *prima facie* case of obviousness. Hence, a *prima facie* case of obviousness has not been established and the rejection is erroneous and should be overturned.

2. Specific Limitations Not Described in the Prior Art

Claims 7, 15 and 23 recite analogous claim features. Claim 7 is representative. Claim 7 recites the following claim feature, which is neither taught nor suggested by either Ueno, Li or the references of record:

> wherein a first set of motion vectors are used by the first unit to generate the first body of data and the first set of motion vectors are used by the second unit to generate the second body of data.

3. Explanation Why Such Limitations Render the Claims Non-obvious Over the Prior Art

According to the Examiner, Ueno teaches:

> wherein a first set of motion vectors are used by the first unit to generate the first body of data and the first set of motion vectors are used by the second unit to generate the second body of data. (*See*, pg. 3, ¶1 of Final Office Action mailed August 2, 2004.)

As further indicated by the Examiner, Ueno teaches:

> wherein the group of at least two separate bodies of data is selected from a reconstructed first body of data (i.e., 132 of FIG. 5) sufficient to permit generation of the viewable video sequence of lesser quality and is represented by the source video sequence, the reconstructed second body of data (i.e., 134 of FIG. 5). (*See*, pg. 2, ¶3 of Final Office Action mailed August 2, 2004.) (Emphasis added.)

Accordingly, as illustrated with reference to FIG. 5, the Examiner equates the signal generated by high resolution prediction circuit 134 as the reconstructed second body of data and the signal generated by low resolution prediction selection circuit 132 as the reconstructed first body of data , as recited by the claimed invention. As described with reference to FIG. 5:

> Candidates for a high resolution predictive signal are produced by the high resolution prediction signal 134 as in the embodiment shown in FIG. 4. They include the detection of forward and backward motion vectors. (col. 10, lines 51–55.) (Emphasis added.)

As described in FIG. 4 of Ueno:

> The high resolution predictive circuit 134 prepares a high resolution predictive signal other than the sent predictive signal using lower resolution signal (e.g., a signal corresponding to prediction that is currently under consideration in MPEG 2), and is sent together with a corresponding motion vector to the prediction mode decision unit 135. (col. 10, lines 9-15.) (Emphasis added.)

As further described by Ueno with reference to FIG. 5:

> This embodiment differs from the above-described embodiment in the way of producing a low resolution predictive signal, which is selected by the low resolution prediction selector 132 and used for prediction of that field dropped out by the field skipping. Motion vector detection is performed and a low resolution predictive signal is prepared using motion compensation in the above-described embodiment, whereas as low resolution predictive signal is prepared using a motion vector which is derived by scaling the motion vector obtained for a candidate for high resolution prediction down to that corresponding to one field time interval. (col. 10, line 60 - col. 11, line 4.) (Emphasis added.)

Applicants respectfully submit that although low resolution prediction selection circuit uses a motion vector from high resolution prediction selection circuit 131, this motion vector is completely distinct from the motion vector generated by high resolution prediction circuit 134. As specifically described by Ueno, the high resolution predictive signal generated by high resolution prediction circuit 134 corresponds to prediction that is currently under consideration in MPEG 2 and includes the detection of forward and backward motion vectors. (*See*, col. 10, lines 53-55.) Conversely, as described by Ueno with reference to FIG. 5:

> An input is separated into even and odd lines by even/odd line separation 130, and an optimal high-resolution picture in the case where prediction is performed with a high-resolution picture for each field is selected by the high-resolution prediction selector 131. (col. 10, lines 55-60.) (Emphasis added.)

Accordingly, Applicants respectfully submit that the motion vector generated by high resolution prediction circuit 134 is completely distinct from the motion vector generated by high resolution prediction selection circuit 131 since the motion vector generated by block 134 is based on prediction under consideration in MPEG 2 and as described, includes detection of forward and backward motion vectors. Conversely, the motion vector generated by block 131 is prepared based on the use of a high resolution picture for each field as the input is separated into odd and even lines by the odd/even line separation 130.

Hence, the combination or modification of Ueno in view of Li would fail to teach or suggest a first set of motion vectors used to generate the first body of data and the first set of motion vectors are used to generate the second body of data, as recited by the claimed invention. Applicants respectfully submit that the separation of an input picture into even and odd fields, as taught by Ueno, to generate the signal produced by block 132 (reconstructed first body of data)

of Ueno is completely distinct from the motion vector used to generate the signal produced by block 134 (reconstructed second body of data), as taught by Ueno.

Hence, the Examiner fails to establish a *prima facie* case of obviousness since the combination or modification of Ueno in view of Li fails to teach all the limitations of the claimed invention. Id. Furthermore, for at least the reasons indicated above, the Examiner also fails to illustrate a motivation within either Ueno, Li or the skill in the art to modify Ueno, as suggested by the Examiner in view of Li. Consequently, Applicants respectfully submit that the Examiner could only arrive at the claimed invention through inappropriate hindsight.

Therefore, Applicants respectfully submit that a *prima facie* case of obviousness is not established and therefore, the rejection is erroneous and should be overturned. Accordingly, Applicants respectfully request that the §103(a) rejection of Claims 7, 15 and 23 be overturned.

VIII. CONCLUSION AND RELIEF

Based on the foregoing, Applicant requests that the Board overturn the rejection of all pending claims and hold that all of the claims of the present application are allowable.

Respectfully submitted,

BLAKELY, SOKOLOFF, TAYLOR, & ZAFMAN LLP

Dated: December 16 2004

By: ______________________
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____
Marilyn Bass December 16, 2004

IX. APPENDIX

The claims involved in this Appeal are as follows:

1. (Previously Presented) A method comprising:

generating a first body of data being sufficient to permit generation of a viewable video sequence of lesser quality than is represented by a source video sequence;

generating a second body of data being sufficient to enhance the quality of the viewable video sequence generated from the first body of data, the second body of data being generated by subtracting a reconstructed body of data from a subsection of the source video sequence, wherein the reconstructed body of data is selected from a group of at least two separate reconstructed bodies of data, and wherein the second body of data includes an enhancement layer that captures differences between the viewable video sequence and the source video sequence; and

predicting a subsection of the enhancement layer according to a prediction mode of a plurality of prediction modes, the plurality of prediction modes including prediction using the source video sequence and a combination of a previous enhancement frame and the first body of data.

2. (Original) The method of claim 1, wherein the group of at least two separate reconstructed bodies of data is selected from a reconstructed first body of data sufficient to permit generation of the viewable video sequence of lesser quality than is represented by the source video sequence, a reconstructed second body of data sufficient to enhance the quality of the viewable video sequence generated from the first body of data, or a combination of the reconstructed first and second bodies of data.

3. (Original) The method of claim 2, further comprising:

prior to generating the second body of data generated by subtracting the reconstructed body of data from the subsection of the source video sequence, spatially reconstructing and clipping the reconstructed first body of data, and spatially reconstructing and clipping the reconstructed second body of data.

4. (Original) The method of claim 2, wherein the second body of data is generated by subtracting a reconstructed body of data from a macroblock of the source video sequence.

5. (Original) The method of claim 2, further comprising:

comparing the at least two separate reconstructed bodies of data to the source video sequence to adaptively select from the reconstructed first body of data, the reconstructed second body of data, or the combination of the reconstructed first and second bodies of data.

6. (Original) The method of claim 2, wherein the selection of the reconstructed body of data is indicated in a syntax of a bit-stream transmitted from an encoder.

7. (Original) The method of claim 2, wherein a first set of motion vectors are used to generate the first body of data and the first set of motion vectors are used to generate the second body of data.

8. (Original) The method of claim 2, wherein the first body of data and the second body of data are generated by a single hardware component.

9. (Previously Presented) An article comprising a computer-readable medium which stores computer-executable instructions, the instructions causing a computer to:

generate a first body of data being sufficient to permit generation of a viewable video sequence of lesser quality than is represented by a source video sequence;

generate a second body of data being sufficient to enhance the quality of the viewable video sequence generated from the first body of data, the second body of data being generated by subtracting a reconstructed body of data from a subsection of the source video sequence, wherein the reconstructed body of data is selected from a group of at least two separate reconstructed bodies of data, and wherein the second body of data includes an enhancement layer that captures differences between the viewable video sequence and the source video sequence; and

predict a subsection of the enhancement layer according to a prediction mode of a plurality of prediction modes, the plurality of prediction modes including prediction using the

source video sequence and a combination of a previous enhancement frame and the first body of data.

10. (Original) The article comprising a computer-readable medium of claim 9, wherein the group of at least two separate reconstructed bodies of data is selected from a reconstructed first body of data sufficient to permit generation of the viewable video sequence of lesser quality than is represented by the source video sequence, a reconstructed second body of data sufficient to enhance the quality of the viewable video sequence generated from the first body of data, or a combination of the reconstructed first and second bodies of data.

11. (Original) The article comprising a computer-readable medium of claim 10, further including additional instructions causing the computer to:

prior to generating the second body of data generated by subtracting the reconstructed body of data from the subsection of the source video sequence, spatially reconstruct and clip the reconstructed first body of data, and spatially reconstruct and clip the reconstructed second body of data.

12. (Original) The article comprising a computer-readable medium of claim 10, wherein the second body of data is generated by subtracting a reconstructed body of data from a macroblock of the source video sequence.

13. (Original) The article comprising a computer-readable medium of claim 10, further including additional instructions causing the computer to:

compare the at least two separate reconstructed bodies of data to the source video sequence to adaptively select from the reconstructed first body of data, the reconstructed second body of data, or the combination of the reconstructed first and second bodies of data.

14. (Original) The article comprising a computer-readable medium of claim 10, wherein the selection of the reconstructed body of data is indicated in a syntax of a bit-stream transmitted from an encoder.

15. (Original) The article comprising a computer-readable medium of claim 10, wherein a first set of motion vectors are used to generate the first body of data and the first set of motion vectors are used to generate the second body of data.

16. (Original) The article comprising a computer-readable medium of claim 10, wherein the first body of data and the second body of data are generated by a single hardware component.

17. (Previously Presented) A system comprising:

a first unit to generate a first body of data being sufficient to permit generation of a viewable video sequence of lesser quality than is represented by a source video sequence;

a second unit to generate a second body of data being sufficient to enhance the quality of the viewable video sequence generated from the first body of data, the second body of data being generated by subtracting a reconstructed body of data from a subsection of the source video sequence, wherein the reconstructed body of data is selected from a group of at least two separate reconstructed bodies of data, and wherein the second body of data includes an enhancement layer that captures differences between the viewable video sequence and the source video sequence; and

a third unit to predict a subsection of the enhancement layer according to a prediction mode of a plurality of prediction modes, the plurality of prediction modes including prediction using the source video sequence and a combination of a previous enhancement frame and the first body of data.

18. (Original) The system of claim 17, wherein the group of at least two separate reconstructed bodies of data is selected from a reconstructed first body of data sufficient to permit generation of the viewable video sequence of lesser quality than is represented by the source video sequence, a reconstructed second body of data sufficient to enhance the quality of the viewable video sequence generated from the first body of data, or a combination of the reconstructed first and second bodies of data.

19. (Previously Presented) The system of claim 18, wherein prior to the second unit generating the second body of data generated by subtracting the reconstructed body of data from the subsection of the source video sequence, spatially reconstructing and clipping the reconstructed first body of data, and the second unit spatially reconstructing and clipping the reconstructed second body of data.

20. (Original) The system of claim 18, wherein the second body of data is generated by subtracting a reconstructed body of data from a macroblock of the source video sequence.

21. (Original) The system of claim 18, wherein the second unit compares the at least two separate reconstructed bodies of data to the source video sequence to adaptively select from the reconstructed first body of data, the reconstructed second body of data, or the combination of the reconstructed first and second bodies of data.

22. (Original) The system of claim 18, wherein the selection of the reconstructed body of data is indicated in a syntax of a bit-stream transmitted from the system.

23. (Original) The system of claim 18, wherein a first set of motion vectors are used by the first unit to generate the first body of data and the first set of motion vectors are used by the second unit to generate the second body of data.

24. (Original) The system of claim 18, wherein the first unit and the second unit are included on a single hardware component.

25. (Withdrawn) A method comprising:

encoding a source video sequence, wherein encoding the source video sequence includes generating a base layer bitstream; and

generating a plurality of enhancement layer bitstreams,

wherein the plurality of enhancement layer bitstreams capture differences between the source video sequence and the base layer bitstream, and

wherein generating a base layer bitstream comprises

predicting a source video frame of the source video sequence using a previous base layer frame of the base layer bitstream and a previous enhancement layer frame of an enhancement layer bitstream of the plurality of enhancement layer bitstreams.

26. (Withdrawn) The method of claim 25, wherein the plurality of enhancement layers are a plurality of bitslices of the differences between the source video sequence.

TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

Application No.	09/758,647
Filing Date	January 10, 2001
First Named Inventor	Wen-Hsiao Peng
Art Unit	2613
Examiner Name	Lee, Richard J.
Attorney Docket Number	4239010900

Total Number of Pages in This Submission: 28

ENCLOSURES *(check all that apply)*

- [x] Fee Transmittal Form
  - [x] Fee Attached
- [ ] Amendment / Response
  - [ ] After Final
  - [ ] Affidavits/declaration(s)
- [ ] Extension of Time Request
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- [ ] Information Disclosure Statement
  - [ ] PTO/SB/08
- [ ] Certified Copy of Priority Document(s)
- [ ] Response to Missing Parts/ Incomplete Application
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Firm *or* Individual name	Joseph Lutz, Reg. No. 43,765 BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP
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Date	December 16 2004

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Patent fees are subject to annual revision.

☐ Applicant claims small entity status. See 37 CFR 1.27.

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FEE CALCULATION

1. EXTRA CLAIM FEES

			Extra Claims		Fee from below		Fee Paid
Total Claims	24	- 20** =	0	x	50.00	=	$0.00
Independent Claims		- 3** =	0	x	200.00	=	$0.00
Multiple Dependent						=	

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description
1202	50	2202	25	Claims in excess of 20
1201	200	2201	100	Independent claims in excess of 3
1203	360	2203	180	Multiple Dependent claim, if not paid
1204	300	2204	150	**Reissue independent claims over original patent
1205	300	2205	150	**Reissue claims in excess of 20 and over original patent

**or number previously paid, if greater, For Reissues, see below

SUBTOTAL (1) ($) 0.00

2. ADDITIONAL FEES

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
1051	130	2051	65	Surcharge - late filing fee or oath	
1052	50	2052	25	Surcharge - late provisional filing fee or cover sheet.	
2053	130	2053	130	Non-English specification	
1251	120	2251	60	Extension for reply within first month	
1252	450	2252	225	Extension for reply within second month	
1253	1,020	2253	510	Extension for reply within third month	
1254	1,590	2254	795	Extension for reply within fourth month	
1255	2,160	2255	1,080	Extension for reply within fifth month	
1401	500	2401	250	Notice of Appeal	
1402	500	2402	250	Filing a brief in support of an appeal	500.00
1403	1,000	2403	500	Request for oral hearing	
1451	1,510	2451	1,510	Petition to institute a public use proceeding	
1460	130	2460	130	Petitions to the Commissioner	
1807	50	1807	50	Prosessing fee under 37 CFR 1.17(q)	
1806	180	1806	180	Submission of Information Disclosure Stmt	
1809	790	1809	395	Filing a submission after final rejection (37 CFR § 1.129(a))	
1810	790	2810	395	For each additional invention to be examined (37 CFR § 1.129(b))	

Other fee (specify) ____________

SUBTOTAL (2) ($) 500.00

SUBMITTED BY

Complete (if applicable)

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Signature				Date	12-16-04

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